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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,314	09/02/2003	Takehiro Sato	031098	1723
38834	7590	06/14/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			MALDONADO, JULIO J	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/652,314	SATO, TAKEHIRO	
	<b>Examiner</b>	<b>Art Unit</b>	
	Julio J. Maldonado	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 April 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/11/2005 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (U.S. 2004/0026031 A1) in view of Suenaga et al. (U.S. 6,569,696 B2), Anai et al. (U.S. 6,458,208 B1) and Shimane (U.S. 2003/0017256 A1).

Smith et al. (Fig.3E) teach a patterning method including the steps of providing a substrate (101-108), said substrate containing an amorphous surface (108); and applying a photoresist on it for further patterning ([0042]).

Smith et al. fail to teach wherein said applying of the photoresist includes thermal processing for evaporating water from a surface of the substrate and making the surface of the substrate hydrophobic with a hydrophobic processing material.

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However, Suenaga et al. (Figs.3 and 4) teach a method to apply a resist in a surface of a substrate in a processing apparatus, wherein said processing apparatus includes a plurality of stacked units, wherein said stacked units includes a heating unit and a cooling unit, and wherein the process to apply the resist on the surface of the semiconductor substrate includes the steps pretreat the surface of the surface including thermally processing the surface of the substrate; and applying a resist onto the substrate after <sup>performing</sup> ~~performing~~ said pretreatment, wherein the step of thermally processing the substrate is performed in dehumidified air (column 4, line 26 – column 5, line 43).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Smith et al. and Suenaga et al. to enable applying the photoresist of Smith et al. according to the teachings of Suenaga et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of applying the disclosed photoresist of Smith et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine (MPEP 2144.07).

The combined teachings of Smith et al. and Suenaga et al. fail to teach performing said thermal processing step for evaporating water <sup>from</sup> ~~from~~ the surface of the substrate; and making the surface of the substrate hydrophobic with a hydrophobic processing material, wherein said hydrophobic processing material is hexamethyldisilazane. However, Anai et al. (Figs.3, 4, 10 and 11) teach a method of applying a resist material on a surface of a substrate in a processing apparatus, wherein said processing apparatus includes a plurality of stacked units including a series of

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cleaning units (16, 18), a heating unit (17) and a cooling unit (19), and wherein said process includes the steps pretreat the surface of the surface including thermally processing for evaporating water from the surface of a substrate after performing a cleaning step, and making the surface of the substrate hydrophobic with hexamethyldisilazane vapor; and applying a resist onto the substrate after performing said pretreatment step (column 6, lines 4 – 50, and column 10, lines 4 – 36).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Smith et al., Suenaga et al. and Anai et al. to enable the pretreatment step of Suenaga et al. to be performed according to the teachings of Anai et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of performing the disclosed pretreatment step of Smith et al. and Suenaga et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine (MPEP 2144.07) and because this would result in a clean, hydrophobic semiconductor substrate (Anai et al., column 10, lines 4 – 35).

The combined teachings of Smith et al., Suenaga et al. and Anai et al. substantially teach all aspects of the invention but fail to disclose wherein a humidity of the dehumidified atmosphere is below 20% including 20%. However, Shimane in a related and conventional method to form photoresist layers teaches that applying conditions to required to form resist layers include temperature of the resist and ambient humidity and that such parameters are preset in order to obtain optimum conditions ([0006]). Therefore, it would be obvious to one of ordinary skill in the art at the time the

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invention was made to combine the teachings of Smith et al., Suenaga et al. and Anai et al. with the teachings of Shimane et al. to enable independently controlling the temperature and humidity conditions of the resist deposition unit of Smith et al., Suenaga et al. and Anai et al. as taught by the conventional teachings of Shimane.

Still, the combined teachings of Smith et al., Suenaga et al., Anai et al. and Shimane fail to expressly teach wherein the step of thermal processing to the step of making the substrate surface hydrophobic is performed in a dehumidified atmosphere. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the atmosphere through the above-mentioned steps has to be dehumidified because the objective during said above mentioned steps as disclosed by the prior art of record is to keep the surface of the substrate dry and eventually hydrophobic.

Furtherstill the combined teachings of Smith et al., Suenaga et al., Anai et al. and Shimane fail to teach wherein in the step of thermal processing, a temperature of the substrate is above 100°C including 100°C. However, the selection of the recited temperature range is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species to result in the evaporation of water from the surface of the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above-mentioned temperature range to arrive at the claimed invention.

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***Response to Arguments***

4. Applicant's arguments with respect to claims 1-15 and 20 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***


5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado  
Patent Examiner  
Art Unit 2823

Julio J. Maldonado  
June 7, 2005

  
George Fourson  
Primary Examiner